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ENGINEERING DESIGN FILE

Project/Task Large Field ISV Test
Subtask

Subject : ISV LFT SITING REQUIREMENTS AND SELECTION

Abstract :

This document is written to address ISV LFT Program siting requirements for completing Large Field Test (LFT) demonstrations in both radioactively contaminated (hot) and noncontaminated (cold) areas of the INEL. Based on those requirements, a recommendation is to be made for picking specific locations for the LFT melt test sites.

This EDF will formalize the above mentioned process by reaffirming those requirements and listing alternate locations available at the INEL for the hot and cold test sites. Discussion of siting attributes based upon the requirements will be included for both the hot and cold melt test sites.

In conclusion, recommendations have been made in this document for locating the hot and cold melt test sites. The recommended location of the two hot sites is in a 30 ft. by 60 ft. rectangular area located in the southwestern quadrant of Pit-9. The recommended location of the cold site is in an area of the SDA located on the opposite side of the ISV LFT process equipment from the hot melt test sites. Figure 4 is a representation of these recommended sites.

Distribution (complete package)

Distribution (cover sheet only): Project EDF file log, EDF serial no. log

Author	Dept.	Reviewed	Date	Approved	Date
Paul A. Sloan	7170	John F. Nichols	8/26/91	See Attached Approval Sheet	

ACRONYMS

ARA	Auxiliary Reactor Area at the INEL
BWIS	Buried Waste Information System
DOE	Department of Energy
EDF	Engineering Design File
EFS	Electrode Feed System
HEPA	High Efficiency Particulate Air
INEL	Idaho National Engineering Laboratory
ISV	Insitu Vitrification
LFT	Large Field Test
PBF	Power Burst Facility at the INEL
PNL	Pacific Northwest Laboratory at Hanford, Washington
RFPDOW	Rocky Flats Plant operated by DOW Chemical Corporation at Rocky Flats, Colorado
RI/FS	Remedial Investigation / Feasibility Study
ROD	Record of Decision
RWMC	Radioactive Waste Management Complex at the INEL
RWMIS	Radioactive Waste Management Information System
SPERT	Special Experimental Reactor Test Area at the INEL
TAN	Test Area North at the INEL
TRU	Transuranic

REFERENCES

EDF-ISV-024 — ISV Field Test Siting and Source Term
Author: T. E. Wierman

PNL-5738 — Description and Capabilities of the Large Scale Insitu Vitifrication Process
Author: J. L. Buelt
J. G. Carter

TREE-1286 — Initial Drum Retrieval Final Report
Author: K. B. McKinley
K. D. McKinney

C. E. Bigelow letter to P. A. Sloan date 11-13-90
Subject: INEL LSRT Site Requirements for ISV

April 17, 1990

ISV LFT SITING - PEER REVIEW COMMITTEE APPROVAL SHEET

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ISV REQUIREMENTS

ISV SCHEDULING REQUIREMENTS

The Record of Decision (ROD) associated with the SDA RI/FS is due for completion in mid-calendar year 1994. This information coupled with the fact that samples for ISV product evaluation can't be taken for approximately eight months after test completion to allow for melt cooling necessitates a very aggressive ISV LFT test schedule. Anything that can be done to minimize the amount of time required in repositioning the process equipment between test will be beneficial in achieving this schedule.

It has been decided by the ISV LFT program that both hot tests will be conducted at Pit-9. Time requirements for equipment set up between the two hot tests will be limited to movement of only the off-gas hood and line due to the PNL equipment design. In our proposed test series of one cold and two hot tests, it would be possible to save a considerable amount of time if we located the hot and cold test sites as near as possible to each other minimizing equipment set up time between test.

ISV EQUIPMENT REQUIREMENTS

The ISV process equipment will be used in conducting all the ISV LFT melt tests at the INEL. As this equipment is common to all three melt test sites the equipment requirements are listed early in this document.

Existing PNL ISV equipment is designed to process primarily contaminated soils. An effort is in progress to design an INEL specific ISV processing system that will integrate existing PNL design and Technology into a processing unit that also will safely process other types of waste forms buried in soil. In order to meet siting schedules that specify ISV test sites, an assumption will be made at this point that the new INEL design will be similar in size and function to the PNL existing equipment; therefore equipment requirements also should be similar.

The PNL designed ISV process equipment required for insitu vitrification of soils or waste is contained in three trailers mounted on wheels sufficient to accommodate a move to any site over compacted ground. The three trailers consist of an off gas-trailer, a process control trailer, and a support trailer. Also associated with the system is the off-gas hood and off-gas line that collects gaseous effluent and directs it to the off-gas trailer. Other equipment required for support of the process are an office trailer plus an emergency diesel generator that supplies backup power for off-gas system components in the event of a power outage. The following is a brief overview of the PNL

ISV process equipment:

OFF-GAS TRAILER- The off-gas trailer is enclosed and houses the system off-gas treatment equipment. This equipment consists of a cooler followed by a dual scrubbing system comprising quenchers, scrubbers, vane separators and scrub solution tanks. Following the dual systems the off-gas is treated by a condenser, another vane separator, a heater, and then two banks of HEPA filters before being discharged via a blower out the off-gas system stack. The off-gas trailer measures 12 ft. in width, 60 ft. in length, and the maximum height is 14.2 ft.; the trailer weighs 121,000 lb.

PROCESS CONTROL TRAILER-The process control trailer is a covered van housing the control station where all process monitoring operations are performed. In addition to the monitoring station this trailer houses miscellaneous support equipment for the off-gas system. The dimensions of the process control trailer are 8 ft. wide by 45 ft. long and is 13.4 ft. high.

SUPPORT TRAILER-The support trailer houses the electrical power supply and glycol cooling system. A standard flat bed trailer measuring 8.5 ft wide by 48 ft long is 13.6 ft high including the height of the mounted equipment. The trailers load capacity is 75,000 lb.

The process equipment when assembled for operation is configured such that the three equipment trailers are connected in tandem. The support trailer is located in the lead position, the off-gas trailer then follows with the process control trailer bringing up the rear. The trailers have hitches that connect them mechanically front to back with electrical and mechanical equipment intertrailer connections being made with flexible materials in a labor intensive process. Once the trailers are assembled they can remain coupled during movement from one melt site to another to save assembly time and cost. Movement is restricted to one direction (forward) over undisturbed or compacted soil with the support trailer in the lead position. It should be noted here that the turning radius of the assembled equipment is approximately 110 ft. The fully assembled PNL processing equipment is approximately 160 ft. long and about 12 ft. wide at the widest point. The off-gas hood and off-gas line extend to one side of the equipment approximately 90 ft. over the area to be processed leaving 50 ft. between the hood and the melt area for safety reasons. The support equipment and the emergency generator have to be positioned near the process equipment, but have some latitude in requirements for their specific locations. In order to accommodate space needs for the process and support equipment, an area approximately 160 ft. long by 40 ft. wide would be sufficient. Another requirement is that there be a minimum of 50 ft. between the edge of the melt site and the process equipment for safety reasons. A reproduction of a

photograph showing the PNL ISV LFT process equipment assembly is shown in Figure 1.

4500 kva of power at 13.8 kv is required for the process equipment during operation. 3750 kva of power at 13.8 kv is required for powering the electrode system via a Scott-Tee transformer located on the support trailer (Due to the design of the Scott-Tee transformer it is absolutely necessary to provide power to it at 13.8 kv). Power to the off-gas equipment comes from a 750 kva transformer also located on the support trailer at 480 v. In the event of a power failure a 750 kva backup emergency generator is required to provide emergency power to the off-gas system. The office support trailer requires an additional 50 kva power at 220 v that must be provided from a transformer separate from the process equipment.

The LFT is capable of melting various waste forms within the melt area; however PNL has established certain criteria (PNL-5738) associated with the PNL process equipment that should not be exceeded. To prevent electrical shorting of the electrodes, metal content in the melt should not exceed 5% of the total melt weight and large metallic objects should be avoided. To prevent overpressurization of the off-gas hood due to burning pyrolized combustibles, combustible liquids within the melt area should not exceed 4800 kgm per meter of melt area depth or 7% weight of the total melt volume, combustible solids should not exceed 3200 kgm per meter of melt depth, and voids within the melt area should not exceed 4.3 cubic meters per occurrence.

ISV LFT COLD TEST SITING REQUIREMENTS

In reference to test siting requirements there are two main objectives in conducting an ISV LFT noncontaminated or cold test. One is to perform an integrated equipment systems checkout (Systems Operational Test) for the initial ISV LFT equipment start up, and the other is to perform an ISV LFT equipment design qualification test. There is discussion within the ISV program suggesting that a separate cold test for each of these objectives may be required. When the cold test site selection is made, a siting envelope of sufficient area will be specified to accommodate the possibility of two tests.

Requirements for completion of cold testing that support the scope identified above and alternatives meeting those requirements are listed as follows:

1. EQUIPMENT POWER REQUIREMENTS- The equipment requirements text above identifies the need for a minimum of 4.5 mw of power at 13.8 kv for the ISV process equipment.

   A DOE facility design requirement is that all the sites listed below with the exception of the RWMC have redundant

power transformers each of which has the capability of solely supplying power to its respective facility. ISV power requirements are such that when the system is in operation this redundant power capability for the facilities is compromised. Special DOE approval will be required to operate these facilities without this redundant power capability when ISV testing is in progress. The following is a listing of those INEL facilities capable of supplying required power:

A. The TAN facilities substation has two redundant 10 mw transformers supplying power at 13.8 kv. The cold test could be sited in an area near this substation.

B. The SPERT substation has two redundant 5 mw transformers supplying power at 13.8 kv to the PBF, SPERT, and ARA areas. The cold test could be sited in an area near this substation.

C. The Scoville substation has two redundant 10 mw transformers supplying power at 12.47 kv. This electrical power is not supplied at the required 13.8 kv, but still may be considered assuming the INEL specific ISV LFT can be designed to accept power at 12.47 kv. The ISV cold test could be sited near the scoville substation.

D. The RWMC can be considered as a site for the cold test even though RWMC power upgrades have not been completed at this time. Sufficient power at 13.8 kv will be made available at the RWMC by the time the new ISV equipment is designed, manufactured, and ready for operation either through RWMC power system upgrades or by providing a portable source of power (Diesel Generators) for the tests. The RWMC has several possible cold test siting locations that will be identified in a later section of this EDF.

2. EQUIPMENT SPACE REQUIREMENTS- The equipment requirements text above clearly identifies the need for a sufficiently large area (40 ft. X 160 ft.) adjacent to the melt site capable of supporting the ISV process equipment and its associated support equipment.

All listed alternate areas will require that their specific Area Landlord approve siting of the ISV cold test within their area of responsibility.

A. The TAN facility substation has adequate room for process and support equipment setup.

B. The SPERT Substation has adequate room near the

substation for process and support equipment setup.

C. The Scoville Substation also meets the ISV process and support equipment space requirements.

D. The RWMC has several feasible locations where the ISV process and support equipment could be set up. Figure 2 is a map of the RWMC with these locations marked as follows:

1) (RWMC Substation)-- Locating the melt near the new RWMC substation could be beneficial as it would be near the required power source. There would be adequate space here as discussed later in this document, but there is some question as to whether sufficient soil depth to basalt exist in this area for adequate equipment checkout.

2) (Simulated TRU Waste Pit)-- The edge of the Simulated TRU Waste pit located outside the southern boundary of the RWMC could be considered a feasible location.

3) (West of Pit-9)-- The opposite side of the process equipment from the hot test site can be considered a feasible location for the cold test melt as schedule delay concerns would be practically eliminated due to being able to complete all testing without having to move the process equipment.

3. EQUIPMENT WEIGHT DISTRIBUTION REQUIREMENTS- As noted above the ISV processing equipment is contained in portable trailers or assembled on flatbed trailers. The movement or locating of these trailers requires that they be supported as a minimum by compacted or undisturbed soil. All the areas indicated in section 2 above have space available that meet this requirement.

4. EQUIPMENT EVALUATION AND TESTING REQUIREMENTS- As mentioned above the cold test may well be used for equipment design and performance evaluation. The cold test site therefore must have sufficient surficial soil to adequately qualify ISV process equipment. All the areas listed above with the possible exception of one area at the RWMC have locations with adequate surficial soil depth for proper performance evaluation of the ISV LFT process equipment.

ISV LFT HOT TEST SITING REQUIREMENTS

The purpose of the LFT hot tests is to assist in the evaluation of ISV technology in the remediation of both radioactive and

hazardous waste forms at the RWMC in the SDA. The ISV program has selected Pit-9 in the SDA as the site for conducting the two hot ISV tests. Data collected during these test will be used to validate the effectiveness of ISV technology in stabilizing buried waste forms. Requirements for completion of the hot tests to support the scope identified above and alternatives meeting those requirements are listed as follows:

1. EQUIPMENT POWER REQUIREMENTS- The equipment power requirements have been addressed previously in the cold test requirements section. Scoping of the hot test requires that the melt sites be located in Pit-9; therefore power must be supplied either by the RWMC power grid or by an alternative power source (Generators).

2. EQUIPMENT SPACE REQUIREMENTS- The fully assembled equipment will require an area approximately 160 ft. long by 40 ft. wide with a minimum of 50 ft. between the edge of the melt sites and the process equipment for safety reasons. Current design allows for the positioning of the hood over two melt sites without moving the process equipment. The emergency generator will have to be positioned near the process equipment within the specified area mentioned above. As the hot test sites are to be located within Pit-9, certain physical characteristics of that pit influence the space requirements. See Figure 2 for a representation of the pit within the SDA.

   A. The location of Pit-9 in the SDA is such that a berm is installed on the north and east sides of the pit. Several acres of area where no waste has been deposited is located the full length of Pit-9 on its western boundary . For equipment size considerations, the west side of Pit-9 will meet these requirements.

   B. The access road to the SDA is located on the south side of the pit. If siting of the process equipment on the south side of the pit is determined to be a requirement the access road could be moved to accommodate ISV equipment. This would be an expensive undertaking as fences and gates would have to be moved as well as a new road being constructed to accommodate SDA ready access.

3. EQUIPMENT WEIGHT DISTRIBUTION REQUIREMENTS- As noted above the ISV processing equipment is contained in portable trailers or assembled on flatbed trailers. Movement or relocation of these trailers requires that they be supported as a minimum by compacted or undisturbed soil. The areas indicated above have soils that meet these requirements.

4. WASTE CHARACTERIZATION REQUIREMENTS- In order to proceed with equipment design and test safety and risk analysis, it is necessary to have some idea of what types of waste forms will be processed by the ISV LFT equipment during the hot melt test. A preliminary waste characterization effort (EDF-ISV-024) on Pit-9 contents was completed utilizing the BWIS data base that was extracted from data contained in the RWMIS data base. The RWMIS data base is a compilation of data from the RWMC waste deposition manifests of waste deposited at the RWMC. It should be noted that recording requirements for waste deposition at the RWMC have changed significantly over the past few years and are now much more comprehensive and explicit as to specific contents of waste than they were when waste was deposited in Pit-9. As a result, characterization efforts on Pit-9 using the RWMIS data base will have a significant amount of uncertainty. The preliminary characterization work referenced above has indicated that certain areas within Pit-9 have more documented content specific waste forms than in others. Information relating to these specific waste forms and their processability using current ISV technology can be classified into two basic categories of more suitable and less Suitable.

   A primary characteristic of the more suitable waste forms is that content specific documentation of the waste form exist. Another criteria is that the waste form contents are within the processing capabilities of ISV technology. Waste that was shipped from the Rocky Flats Plant when operated by the DOW chemical company (RFPDOW) is well documented and lends itself to the requirements as stated above for the more suitable waste forms for ISV processing.

   Waste forms less suitable for ISV processing are those that do not meet the criteria mentioned above. Some examples of these types of waste forms would be items such as zirconium chips buried in drums, unirradiated fuel, large metal objects that might facilitate the transmittal of heat out of the melt zone proper, and those waste forms not content specific such as metal scrap or combustibles.

   The BWIS data base indicates that the southwest quadrant of Pit-9 contains waste forms mostly comprised of sludges that are relatively well characterized. Other areas within the pit contain various less suitable forms of waste indicating that for ISV purposes we should concentrate our efforts in the southwest quadrant of Pit-9.

5. OTHER CONSIDERATIONS FOR SITING THE HOT TEST- The Waste Retrieval Project currently has no definite plans for future retrieval work at Pit-9; however it is still prudent to consider their concerns as there is still a distinct

possibility of the Waste Retrieval Demonstration project being reinstated at some future date. It is suggested that the ISV project place the hot melt sites within the previously proposed Retrieval Demonstration building walls a minimum of 20 ft. from the pit edge to allow for possible future excavation. In order to achieve a representative melt with a full complement of waste the melt should also be positioned a minimum of 45 feet north of the pit southern boundary to avoid the ramp that is located there as a result of pit construction.

A. The proposed site for The Waste Retrieval building covers the entire southern part of Pit-9 extending approximately 175 ft. north from the southern boundary. The melt should be located within the specified boundaries of the waste retrieval building.

B. The melts should be set 20 ft. from the western boundary and approximately 45 ft. north of the southern boundary.

ISV SITING DISCUSSION

ISV LFT COLD TEST SITING DISCUSSION

Discussion of the attributes of the cold test siting requirements are listed as follows:

1. EQUIPMENT POWER REQUIREMENTS DISCUSSION- All the mentioned siting locations have the current required power capability or will have a suitable alternative when the cold test is ready to commence. The Scoville substation that does not have 13.8 kv power would require the new equipment design to accommodate 12.47 kv power while the RWMC would require power system upgrades or portable generators as an alternate power source for the required power. The TAN and SPERT substations already have the required power.

   Current schedules have power upgrades to the RWMC being completed by January of 1994. This time table will not support the ISV test schedule, but may change in the future to accommodate ISV testing. This is not likely due to the long lead times associated in requisitioning some of the required equipment. Preliminary cost estimates have shown that expediting RWMC upgrades to accommodate the ISV test schedule as opposed to running the test with an alternate power source is not cost effective even if it were possible to overcome the equipment lead time problems. Due to the probability of RWMC upgrades not being completed in time to accommodate our test schedule, portable generators can be obtained to provide the necessary power. With an alternate

power source, both the hot and cold tests could be completed at the RWMC. This would minimize the time and cost required to transport process equipment from the cold to the hot test sites with a strong possibility of eliminating these cost and schedule delays altogether depending on site specifics at the RWMC. Prior to using portable generators at the RWMC it will be necessary to complete a study that addresses safety considerations relative to noise pollution, fuel handling, and fire protection. It also should be noted that space will have to be provided for locating these generators at the test site.

2. EQUIPMENT SPACE REQUIREMENTS DISCUSSION- All areas mentioned above with the required power available have adequate space to set up the equipment for ISV processing. Again addressing the schedule requirements above, it should be noted that those proposed cold test sites other than the RWMC will significantly increase the distance required to move the ISV process and support equipment to the hot melt test site that will be located at the RWMC in Pit-9. This increased movement will cause a proportional increase in schedule delays incurred between cold test completion and commencement of hot test operation. The cost for increased movement as mentioned is significant, but the major contributor to down time between tests will be the disassembly and set up of the process equipment. To keep these schedule delays to an absolute minimum, the site near Pit-9 would be most desirable as there would be no need for equipment movement for hot test preparation.

   The probability of using portable generators at the RWMC brings forth the issue of adequate room for locating them. It will take approximately an area 50 ft. by 75 ft. to position the generators and their associated equipment. More room will be needed to locate fuel tanks or tankers to supply the required fuel for operation. All three of the feasible locations at the RWMC have adequate space nearby for this equipment. Safety studies mentioned above may even require that the generators be set up outside the SDA with power run from them to the process equipment. There is adequate room with access surrounding the SDA to provide for this if it is determined necessary.

3. EQUIPMENT WEIGHT DISTRIBUTION DISCUSSION- The specific location at the cold test site should address the fact that the PNL equipment is designed to be moved and set up on undisturbed or compacted soil. The equipment should not be moved or positioned over buried waste.

   Even when equipment is moved over compacted or undisturbed soil there will be restrictions on movement over these soils due to softening during spring thawing or periods of rain.

Once the equipment is set there should be no problem with settling.

The TAN, Scoville, and the SPERT substation areas meet the soil requirements for the cold test siting but would require movement of the ISV LFT process equipment over INEL roads and some sections of Idaho State highways in order to set the equipment up for the hot test at the RWMC. In addition to the schedule delays encountered in moving the equipment there are requirements to obtain Idaho State permits to move the equipment over state highways. Permitting should not cause schedule delays if sufficient time is allowed for obtaining them. Except for initial set up, siting the cold melt at the RWMC would eliminate permitting problems as well as schedule delays due to having to move the equipment relatively large distances between melts.

4. EQUIPMENT EVALUATION AND TESTING DISCUSSION- The primary requirement for equipment evaluation and testing is that sufficient surficial soil above basalt be available to adequately test the equipment. All potential locations mentioned earlier with the exception of the one RWMC site near the new substation have the required soil depth. Geophysical surveys indicate approximately 15 ft of depth at the Pit-9 cold test proposed location. Soil depth samples would have to be taken near the new substation to verify sufficient soil as required for the test.

HOT TEST SITING DISCUSSION

Discussion of the attributes of the above listed requirements are listed as follows:

1. EQUIPMENT POWER REQUIREMENTS DISCUSSION- Sufficient discussion of these requirements pertaining to the hot test is contained in the above equipment power requirements section.

2. EQUIPMENT SPACE REQUIREMENTS DISCUSSION- The physical size of the assembled equipment as shown on the PNL ISV equipment site plan will limit the positioning of that equipment to a location along the western boundary of Pit-9. The size limitation also will preclude us from positioning the assembled equipment too near the southern boundary as vehicular traffic on the Subsurface Disposal Area (SDA) access road would be hampered.

3. EQUIPMENT WEIGHT DISTRIBUTION REQUIREMENTS DISCUSSION- The weight of the ISV process equipment trailers, the support trailers, and support equipment will preclude positioning them over any of the pits or trenches located in the SDA. The equipment must be transported and positioned on compacted or undisturbed soil within the SDA boundaries to

provide them with sufficient support. As no waste has been buried on the west side of Pit-9, no problems should be encountered if equipment is positioned in this area. It should be noted that even when located over compacted or undisturbed soil there will be restrictions on movement within the SDA during spring thawing or periods of rain.

4. WASTE CHARACTERIZATION REQUIREMENTS DISCUSSION- While Pit-9 was open, there were many varied waste forms deposited in it that originated from many waste generators. Deposits of waste in the pit were logged or recorded on waste manifest forms that included information as to the amount waste forms deposited, content code of the waste forms deposited, the relative location within the pit where waste forms were deposited, the waste generator that generated the waste, quantities of waste deposited, and other pertinent data. The information from these waste manifest forms was compiled into a data base called the Radioactive Waste Management Information System (RWMIS). Information from the RWMIS data base has been incorporated in the Buried Waste Information System (BWIS) and has been used by personnel associated with the ISV LFT to characterize the waste forms in Pit-9 (EDF-ISV-024). Utilizing the location data derived from the RWMIS, it has been determined that the southwest quadrant of Pit-9 contains waste forms that are comprised mostly of sludges. Within this area are also some waste forms less suitable to ISV processing capabilities, but they are in locations that surround a "pocket" of waste forms considered more suitable. Siting of the ISV hot melt test sites should be located in this area.

5. DISCUSSION OF MISCELLANEOUS CONSIDERATIONS FOR THE HOT TEST SITES- It should be noted that the following items should be considered in developing siting criteria for the ISV LFT hot melt test sites, but other hard requirements determined in this document may take precedence over them.

   It was stated that the melt sites should be located within the proposed Retrieval Demonstration building walls to facilitate possible future excavation and removal of the monoliths. Furthermore the melt location was specified to be a minimum of 20 ft. from the pit edge to accommodate the requirement for sufficient operating room for excavating equipment to maneuver around the monoliths. As the Waste retrieval program has no definite plans for future operations, the requirement for placing the melt 20 ft. away from the Pit-9 western boundary will be superseded by the requirement to place the melt in the "Pocket" mentioned above. The melts can still be located within the proposed retrieval building walls and meet all other requirements.

   Consideration should be given to the fact that a ramp

bordering on the southern boundary may extend into the Pit-9 area approximately 45 ft. The RWMIS and the BWIS both indicate that waste has been deposited within approximately 15 ft of the southern boundary of Pit-9. The Initial Drum Retrieval Final Report (TREE-1286 Fig. 6) , published in August 1978, indicates that waste was uncovered within approximately 20 ft. of the southern boundary of Pit-9. Based on these data, a representative melt should be achieved if the melt were positioned no closer than 20 ft. from the pit southern boundary.

ISV TEST SITE SELECTION

ISV HOT TEST SITE SELECTION- Based on the discussions above it is possible to select the area within Pit-9 that the two ISV hot test melts will be sited. An estimation of the size of an individual melt is taken from PNL's In Situ Vitrification Large-Scale Operational Test Analysis (PNL-5828). The maximum size of the test blocks was approximately 23 ft. on a side forming a square with rounded corners. If the two melts were placed side by side the surface area would be contained within a rectangle 23 ft. by 46 ft. To allow for some tolerance in hood positioning as well as providing insulating room between the melts to assure data integrity of the second melt without waiting for the first melt to cool, a melt zone within the Pit-9 boundaries can be established with dimensions of 30 ft. by 60 ft.

As indicated earlier the southwest quadrant of Pit-9 contains waste forms mostly comprised of sludges that are relatively well characterized (EDF-ISV-024). Within this area are also some waste forms that have been classified as less suitable for ISV processing, but they are in locations that surround a "pocket" of waste forms more suitable to the ISV process. In an effort to minimize the possibility of encountering these fringe disposal sites, a location error has been assigned to each disposal site location (the circles in Figure 3 represent a 25 ft. diameter error allowance for each disposal site). This data would limit the melt zone to an area bordering on the western boundary extending approximately 50 ft. out into the pit on one axis, and from a line located a few feet north and parallel to the southern boundary extending northward into the pit approximately 95 ft.

The data listed under ISV process equipment requirements indicates that the equipment could be set up anywhere on the western boundary of the pit. It would be a good idea not to place the equipment within 10 feet of the western boundary to assure proper support over compacted or undisturbed soil. Considering only these restrictions, it is possible to place the melt within Pit-9 in an area with one axis starting from the pit edge and extending 70 ft. to the east and the other axis starting about 20 ft. from the southern boundary and extending all the way to the northern pit boundary.

In order to avoid the less suitable disposal site locations after establishing the associated error information and still have sufficient contact with the more suitable waste forms for a representative melt, it is necessary to position the melt zone within approximately 10 ft. of the Pit-9 western boundary. For the same reasons it is also necessary to position one corner of the proposed melt zone within approximately 20 ft. of the southern boundary. This is still within the recommended guidelines as stated above. Figure 3 indicates the 30 ft. by 60 ft. rectangle outlining the ISV LFT proposed melt zone that will contain the locations of the two hot or contaminated melt test sites. The State Plane coordinates for the corners of the melt zone are as follows:

Southwest Corner	N669,444.40 E268,123.50
Northwest Corner	N669,501.40 E268,141.90
Northeast Corner	N669,491.70 E268,170.10
Southeast Corner	N669,435.00 E268,151.80

ISV COLD TEST SITE SELECTION- Based upon discussions above a cold test site can be selected that will meet the all the requirements for the ISV LFT cold test. As indicated in the preceding text, the primary requirements common to both the hot and cold test sites is power and space availability. These, coupled with the aggressive schedule, indicate that the cold test site should be as near the RWMC as possible. The three locations at the RWMC that were referred to earlier are indicated on Figure 2.

The first was located near the RWMC substation. With the probability of using an alternate power source being fairly high and the relative difficulty in moving the equipment from this area to the hot melt test site, there isn't much advantage to locating the cold melt here. There also may be insufficient surficial soil here for adequate equipment testing.

The second site at the RWMC locates the melt in the Simulated TRU Waste pit. This site may not meet the specific criteria, yet to be developed, that is to be based upon the new equipment design for evaluation and qualification of the INEL specific LFT equipment. The major problem that would be associated with this site is the requirement for movement and reassembly of equipment from this site to the hot test site.

The third RWMC proposed cold test site option is located in the SDA on the west side of Pit-9. Further testing of soil composition at this location will be completed in fiscal year 90 as well as verification of adequate soil depth for equipment testing. This is the only cold test site location where no movement of the process equipment trailers will be necessary for the later hot tests. The only required changes in system configuration will be hood relocation over the melt areas and the off-gas line hook up to the hood. Selection of this site for locating the cold test will meet all of the requirements stated above as well as providing the best opportunity for maintaining the aggressive schedule the ISV program has adopted.

I recommend that the ISV LFT cold test site be located at the RWMC on the opposite side of the process equipment from the hot test locations (Figure 4 shows the relative locations of both hot and cold test sites). A 20 ft.X 50 ft. cold test melt zone will be identified as a siting envelope of sufficient area to accommodate the possibility of two cold tests. The State plane coordinates for the approximate center of the recommended ISV LFT cold test site melt zone are as follows:

N669525.000
E268008.000

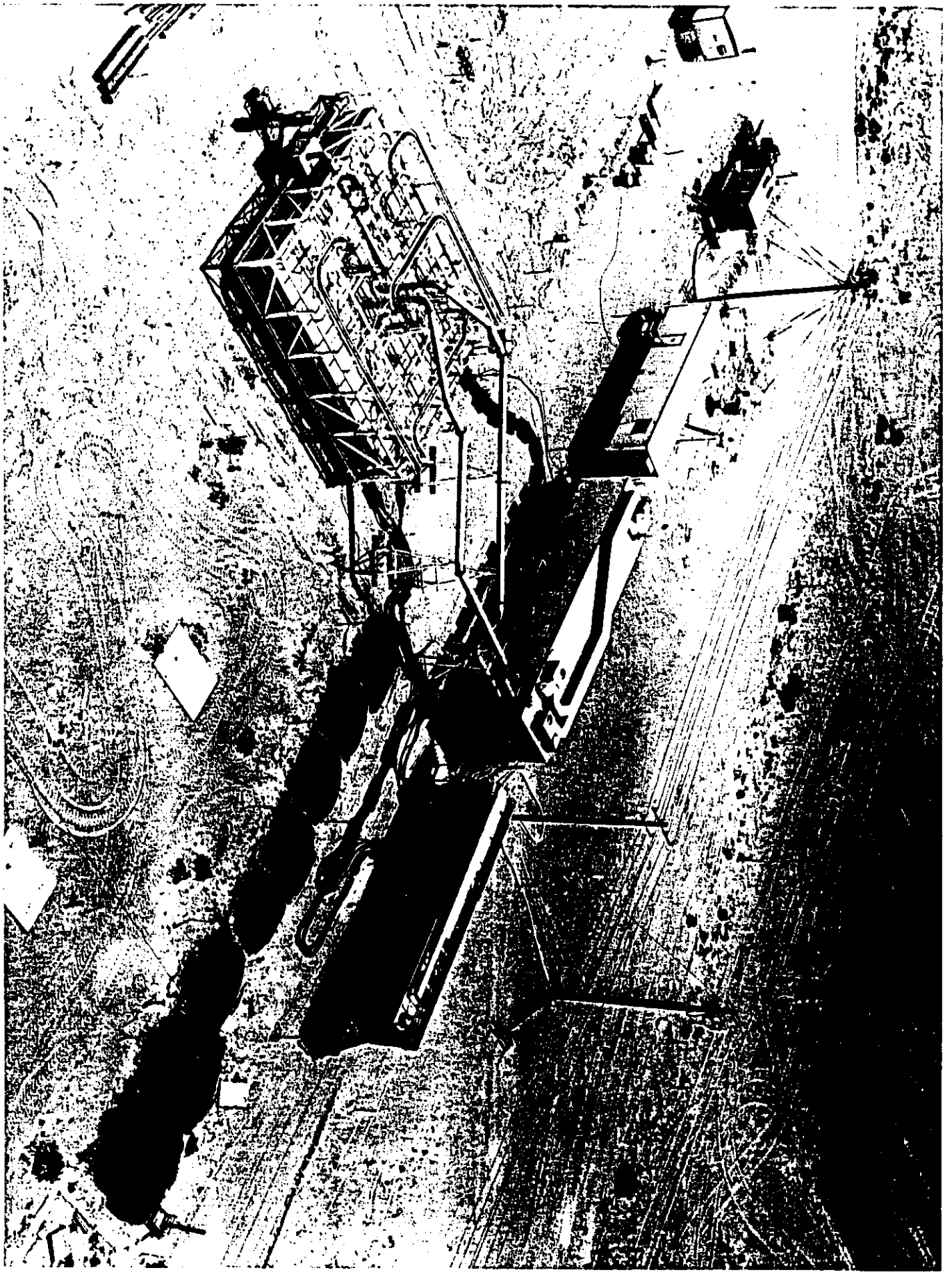

Figure 1

#1- Area near new RWMC substation

#2- Area near simulated TRU Pit

#3- Area near Pit-9

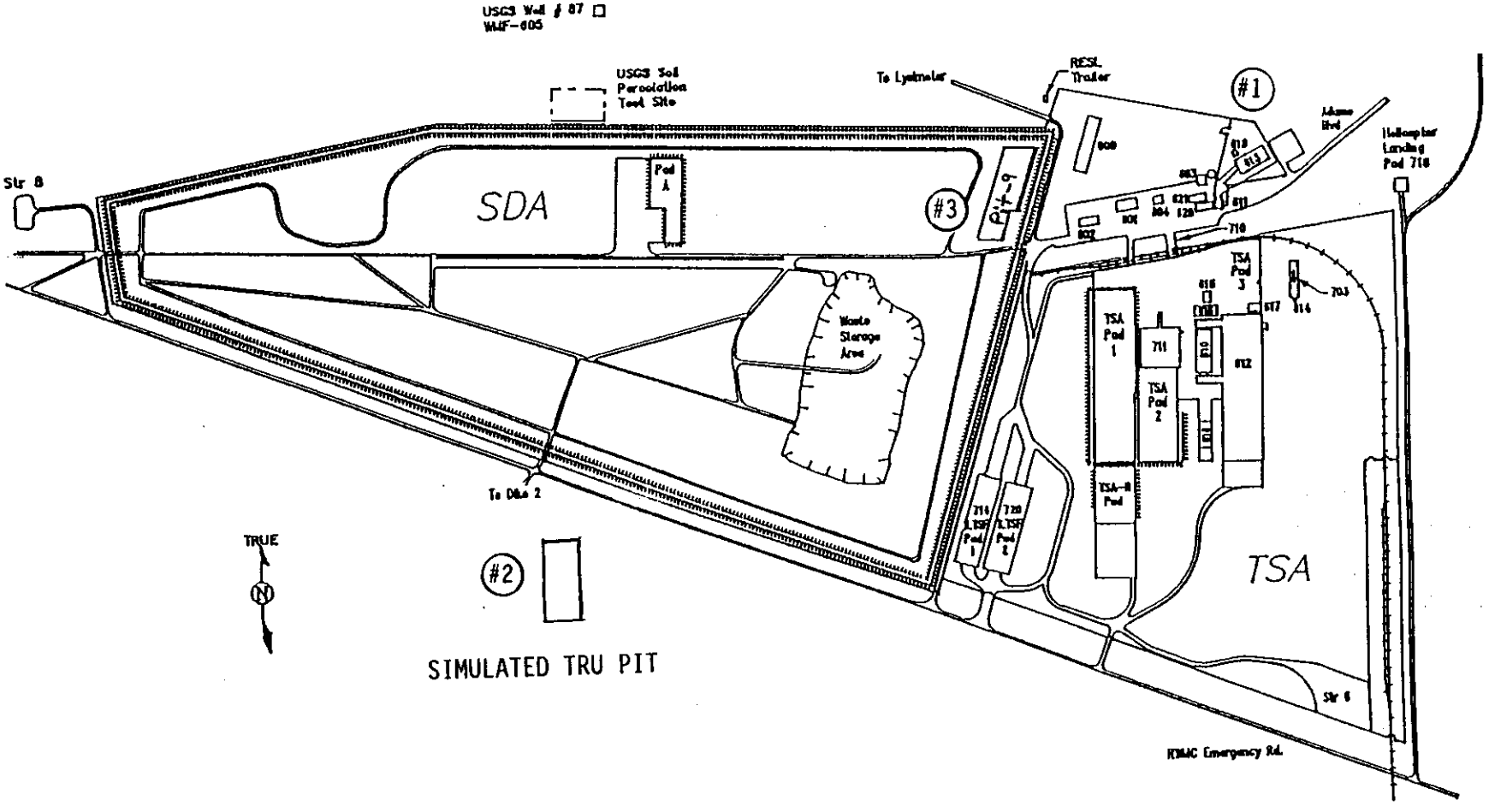

Figure 2 Radioactive Waste Management Complex.

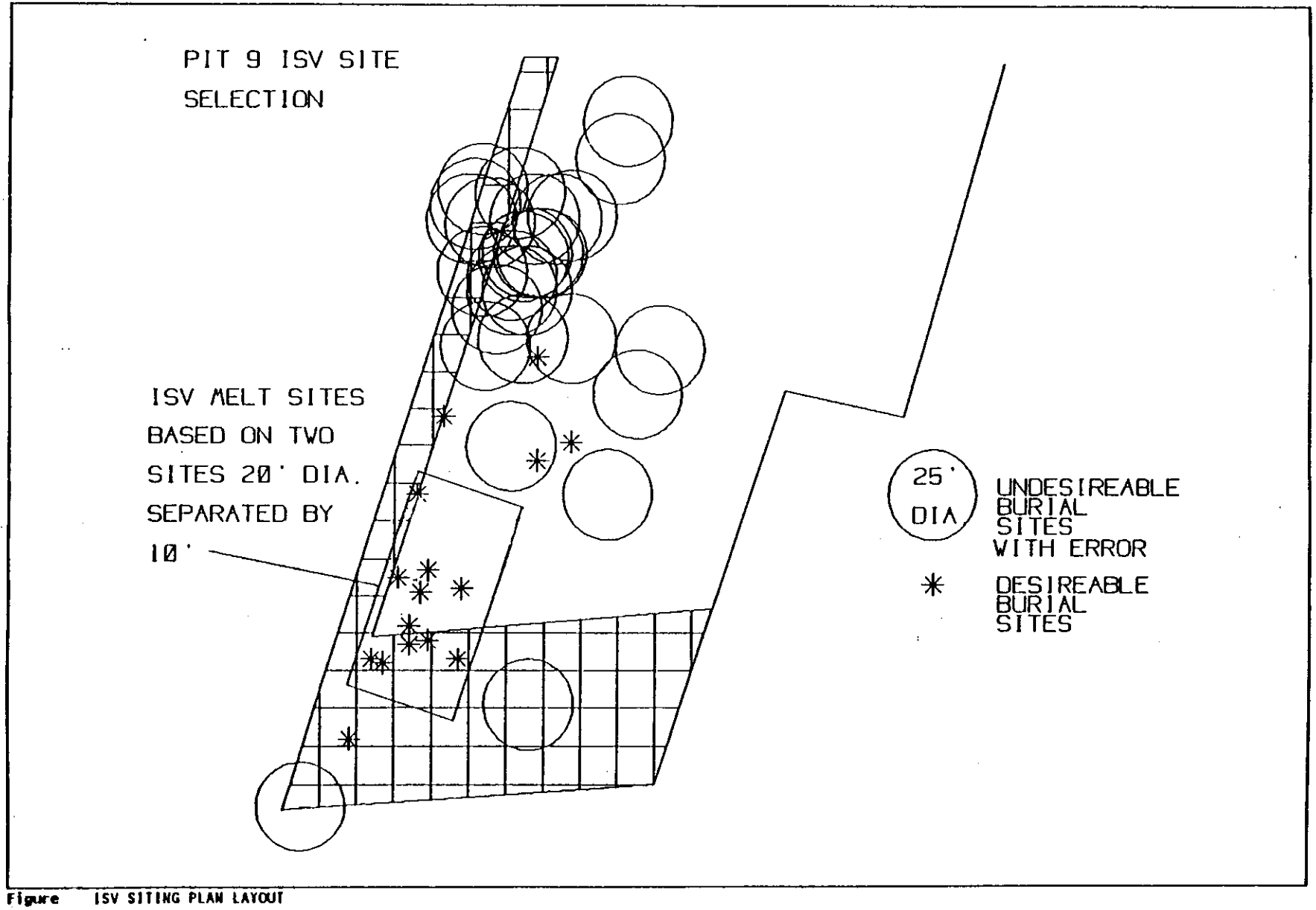

Figure 3

Figure ISV SITING PLAN LAYOUT

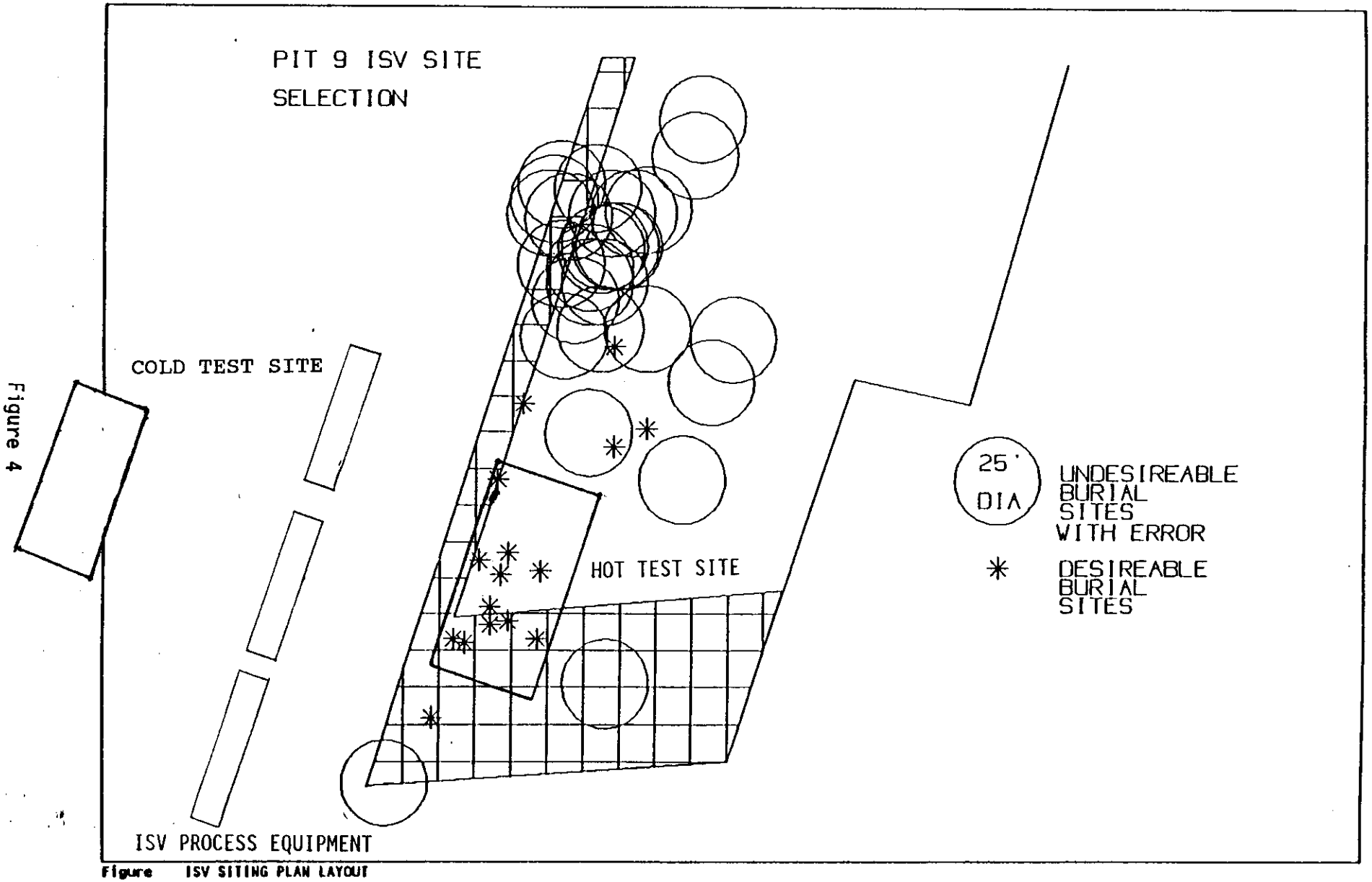

Figure 4

Figure ISV SITING PLAN LAYOUT